

# SHUAI ZHOU

Senior Undergraduate Student of Robotics

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 Shuai Zhou

## SUMMARY

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**Research Interests:** I am primarily interested in developing next-generation decision-making systems for robotics, unifying *planning and learning*, further enabling *multi-robot collaboration* for tasks beyond single-robot reach, and ultimately integrating *safe human-robot interaction* to deploy assistive robots for people with cognitive and physical disabilities.

**Highlights:** 2 years of research experience with a solid mathematical and theoretical background; 4 years of programming experience with multiple languages; 8 months of experience with real robots on various platforms.

**Relevant Courses:** Theory and Technology of Robotics(A); Artificial Intelligence(A); Data Analysis and Modeling(A); Data Structures(A); Designing Information Devices and Systems(A); Modeling, Analysis, and Control of Dynamic Systems(A); Design and Manufacturing I, II(A); Linear Algebra and Analytic Geometry(A); Probability and Statistics(A); Calculus(A);

## EDUCATION

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### SOUTH CHINA UNIVERSITY OF TECHNOLOGY

Bachelor of Engineering in Robotics; GPA: 3.86/4.00

Guangzhou, China

Sep 2022 — Jun 2026 (Expected)

### CARNEGIE MELLON UNIVERSITY

Visiting Student at the Robotics Institute; Host: Prof. [Jiaoyang Li](#)

Pittsburgh, United States

Jun 2025 — Feb 2026 (Expected)

### UNIVERSITY OF CALIFORNIA, BERKELEY

Exchange Student concentrating in EECS; GPA: 4.00/4.00

Berkeley, United States

Aug 2023 — Dec 2023

## PUBLICATION(† equal contribution)

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### PREPRINT

#### Bridging Planning and Execution: Multi-Agent Path Finding Under Real World Deadlines

Jingtian Yan†, [Shuai Zhou](#)†, Stephen Smith, Jiaoyang Li

— Under Review

- Proposed a general MAPF framework that bridges the gap between planning and real-world execution (REMAP).
- Incorporated an execution-time predictor (ExecTimeNet) with planners to solve the MAPF with Real-world Deadlines.
- Achieved 20% less cost in realistic simulations and deployment.

### CONFERENCE PROCEEDING

#### LSRP\*: Scalable and Anytime Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren | [\[Paper\]](#) | [\[Web\]](#) |

— In SoCS 2025

- Extended LSRP planner to an anytime search framework with completeness and optimality guarantees.
- Identified and corrected theoretical flaws in prior work's state grouping.
- Scaled to 1,000 robots with near-optimal solutions within limited runtime and eventually converged to the optimal one.

#### Loosely Synchronized Rule-Based Planning for Multi-Agent Path Finding with Asynchronous Actions

[Shuai Zhou](#), Shizhe Zhao, Zhongqiang Ren | [\[Paper\]](#) | [\[Code\]](#) | [\[Web\]](#) |

— In AAAI 2025

- Proposed a novel rule-based approach to Multi-Agent Path Finding with Asynchronous Actions.
- Combined asynchronous search-state and rule-based interaction to avoid both deadlock and livelock.
- Demonstrated ability to handle 10× more agents than baselines with only 25% longer makespan.

## SKILL

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**Professional Services:** Reviewer (IROS 2025)

**Robot Platforms:** Unitree G1 Humanoid, Unitree Go1 Quadruped, UFACTORY X-ARM 7

**Robot Simulations:** IsaacLab, Mujoco, Pybullet

**Programming Languages:** Python, C++, Java, HTML, MATLAB, L<sup>A</sup>T<sub>E</sub>X

**Operating Systems:** Windows, Linux(Ubuntu)

**Online learning:** MIT: 6.S184 Generative AI with Stochastic Differential Equations, UC Berkeley: CS 285 Deep Reinforcement Learning, CMU: 16-831 Introduction to Robot Learning, CMU: 10-301/601 Introduction to Machine Learning, CMU: 16745 Optimal Control and Reinforcement Learning, CMU: 16-782 Planning and Decision-making in Robotics, UPenn: Robotics: Computational Motion Planning, UPenn: Robotics: Aerial Robotics

## RESEARCH PROJECT EXPERIENCE(lead and co-lead)

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### LEARNING CROSS-EMBODIMENT MANIPULATION WITH HUMAN DEMONSTRATIONS

CARNEGIE MELLON UNIVERSITY, **SAFE AI Lab**

*Research Intern; Supervised by Prof. Ding Zhao*

Pittsburgh, United States

Sep 2025 — Present

- Improving Cross-Embodiment manipulation model with flow-matching action-head for better generalization.
- Developing a whole-body controller for the humanoid with reinforcement learning and imitation learning.
- Collaborating with Stanford to collect a comprehensive physical robot dataset for tool use.
- Evaluating learned policies in simulation (IsaacLab) and physical robots (G1 Humanoid, Go1 Quadruped, X-ARM).

### COLLABORATIVE MULTI-ROBOT TASK AND MOTION PLANNING

CARNEGIE MELLON UNIVERSITY, **ARCS Lab**

*Research Intern; Supervised by Prof. Jiaoyang Li*

Pittsburgh, United States

Sep 2025 — Present

- Proposing planning methods that search and sample manipulation motions learned by flow-matching cogeneration.
- Evaluating algorithms (C++, Python) in simulation (MuJoCo) and on mobile robots.

### BRIDGING PLANNING AND EXECUTION FOR REAL-WORLD ROBOT COORDINATION

CARNEGIE MELLON UNIVERSITY, **ARCS Lab**

*Research Intern; Supervised by Prof. Jiaoyang Li*

Pittsburgh, United States

Apr 2025 — Present

- Bridging path planning and execution by introducing Multi-Agent Path Finding with Real-world Feedback.
- Learning execution-time prediction models for real-world planning feedback.
- Developing a closed-loop planning execution framework with the learned model to replan and reset the dependency.
- Evaluating algorithms(C++, Python) in simulation and mobile robots. Co-first-author paper is under review.

### SCALABLE PATH PLANNING FOR MULTI-ROBOT WITH ASYNCHRONOUS ACTIONS

UNIVERSITY OF CALIFORNIA, IRVINE, **IDM Lab**

*Research Collaboration; Supervised by Prof. Sven Koenig*

Irvine, United States

Mar 2025 — Jul 2025

- Developed an unbounded suboptimal anytime planner for Multi-Agent Path Finding with Asynchronous Actions.
- Proposed congestion-aware heuristics and look-ahead mechanisms to improve solution refinement.
- Evaluated algorithms (C++) in grid-based simulation (PyBullet). One first-author journal paper is under preparation.

SHANGHAI JIAO TONG UNIVERSITY, **RAP Lab**

*Research Intern; Supervised by Prof. Zhongqiang Ren*

Shanghai, China

Apr 2024 — Sep 2025

- Developed scalable planners for Multi-Agent Path Finding with Asynchronous Actions that scale to 1,000+ robots.
- Proposed wait-move synchronization for asynchronous rule-based robot interactions to avoid both deadlock and livelock.
- Designed complete, anytime planning framework with proposed pruning and sorting strategies that accelerated search.
- Evaluated algorithms (C++) in grid-based simulation and analyzing theoretical properties (completeness, optimality).

One first-author paper accepted by **AAAI 2025** and one extended abstract accepted by **SoCS 2025**.

## WORK EXPERIENCE

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### QT STEAM Education, Winter Robot Camp

*Teaching Assistant*

Shenzhen, China

Jan 2024 — Feb 2024

- Taught fundamentals of C programming, ROS basics, and circuit board design.

- Provided hands-on mentorship to help high school students build simple autonomous navigation robots.

### South China University of Technology, Volunteer Work

*Volunteer*

Guangzhou, China

Mar 2023 — Present

- Completed 40+ hours of volunteer service, including organizing student sports meets and college admission interviews, supporting campus open days and international events, and assisting with school anniversary celebrations.

## HONORS AND AWARDS

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### Outstanding Visiting Student Fellowship from USIEA

*Awarded to the top student in the UC Berkeley Global Access program; received 6,000 CNY*

Guangzhou, China

Mar 2024

### Merit Student of South China University of Technology

*Top student in Robotics Engineering, Class of 2022*

Guangzhou, China

Feb 2024

### The Third Prize Scholarship by South China University of Technology

*Top 10% of students, receiving 10,000 CNY*

Guangzhou, China

Dec 2023

### Exchange Student Fellowship from South China University of Technology

*Awarded to outstanding students for overseas exchange, receiving 40,000 CNY*

Guangzhou, China

Jul 2023